Claims

1. A device (10) for automated optimization of the service life of technical facilities (20, 21, …) and/or risk determination of technical facilities (20, 21, …), which comprises a capture module (11) for capturing facility data (201, 202, …; 211, 212, …) and an analysis module (13) for analyzing the facility data (201, 202, …; 211, 212, …) and/or optimizing the service life of the facility (20, 21, …), characterized in that the capture module (11) comprises at least one measuring device and/or sensor (111, 112, 113, 114, …), connected to the optimization device (10) decentralized via a network, with corresponding interfaces for determining one or more facility-specific quality factors ($Q20_1$, $Q20_2$, …; $Q21_1$, $Q21_2$, …), wherein the measuring device and/or sensor (111, 112, 113, 114, …) is allocated to a particular technical facility,
that the optimization device (10) comprises a first database (14) with predefined risk elements (1410, 1411, 1412, …), wherein a risk instance and/or a risk potential of the technical facility (20, 21, …) can be detected in a quantified manner by means of a risk element (1410, 1411, 1412, …)
that the optimization device (10) comprises a second database (15) with predefined protection elements (1510, 1511, 1512, …), wherein a protection device and/or a protection possibility of technical facilities (20, 21, …) can be detected in a quantified manner by means of a protection element (1510, 1511, 1512, …),
that the optimization device (10) comprises at least one risk element (1410, 1411, 1412, …) and/or at least one protection element (1510, 1511, 1512, …) stored allocated to the technical facility (20, 21, …), wherein a facility-specific weighting factor ($G20_1$, $G20_2$, …, $G21_1$, $G21_2$, …) can be determined for each risk element (1410, 1411, 1412, …) and protection element (1510, 1511, 1512, …), which weighting factor ($G20_1$, $G20_2$, …, $G21_1$, $G21_2$, …) comprises the relative weighting

ratio of the risk elements (1410, 1411, 1412, …) and/or protection elements (1510, 1511, 1512, …) with respect to one another,

that by means of the at least one measuring device and/or sensor (111, 112, 113, 114, …), a facility-specific quality factor ($Q20_1$, $Q20_2$, …; $Q21_1$, $Q21_2$, …) can be determined for each risk element (1410, 1411, 1412, …) and protection element (1510, 1511, 1512, …), wherein the quality factor ($Q20_1$, $Q20_2$, …; $Q21_1$, $Q21_2$, …) comprises the instantaneous facility-specific instance of a technical risk element (1410, 1411, 1412, …) or protection element (1510, 1511, 1512, …) on the basis of the measured facility data (201, 202, …; 211, 212, …), and

that the optimization device (10) comprises an evaluation module (12) for determining risk analysis values and/or facility optimization values on the basis of the sum of the products of the risk elements (1410, 1411, 1412, …) with associated weighting factors ($G20_1$, $G20_2$, …, $G21_1$, $G21_2$, …) and quality factors ($Q20_1$, $Q20_2$, …; $Q21_1$, $Q21_2$, …) combined with the sum of the products of the protection elements (1510, 1511, 1512, …) with associated weighting factors ($G20_1$, $G20_2$, …, $G21_1$, $G21_2$, …) and quality factors ($Q20_1$, $Q20_2$, …; $Q21_1$, $Q21_2$, …).

2. The device as claimed in claim 1, characterized in that a memory module (17) of the optimization device (10) comprises a multiplicity of facility risk types (170, 171, …), wherein the facility risk types (170, 171, …) in each case comprise at least one risk element (1410, 1411, 1412, …) and/or one protection factor (1510, 1511, 1512, …) and each technical facility (20, 21, …) can be allocated to one facility risk type (170, 171, …), and

that the optimization device (10) comprises a normalization module (18) for automatically generating a facility-risk-type-specific reference value, wherein the facility data (201, 202, …; 211, 212, …) of

different technical facilities (20, 21, …) are normalized on the basis of the reference value of the associated facility risk type (170, 171, …) by means of the normalization module (18).

3. The device (10) as claimed in one of claims 1 or 2, characterized in that the optimization device (10) comprises an extrapolation module (19) for automatically generating the risk analysis values and/or optimization data for possible combinations and weightings of the protection elements (1510, 1511, 1512, …) and/or risk elements (1410, 1411, 1412, …).

4. The device (10) as claimed in one of claims 1 to 3, characterized in that a group risk factor can be allocated to each facility risk type (170, 171, …), wherein the group risk factor can be calculated by means of the evaluation module (12) and comprises the overall risk of all technical facilities of a facility risk type (170, 171, …).

5. The device (10) as claimed in one of claims 1 to 4, characterized in that the capture module (11) is arranged to be accessible decentralized via a network (50).

6. A method for automated risk management and/or automated optimization of the service life of technical facilities (20, 21, …), wherein facility data are captured by means of a capture module (11) of an optimization device (10) and facility risks are optimized by means of an evaluation module (12) of the optimization device (10) on the basis of the facility data (201, 202, …; 211, 212, …), characterized in that a list (141) with risk elements (1410, 1411, 1412, …) is generated and stored in a first database (14) of the optimization device (10), wherein a risk instance and/or a risk potential of technical facilities (20,

21, …) can be detected in a quantified manner by means of a risk element (1410, 1411, 1412, …),

that a list (151) with protection elements (1510, 1511, 1512, …) is generated and stored in a second database (15) of the optimization device (10), wherein a protection device and/or a protection possibility of technical facilities (20, 21, …) can be detected in a quantified manner by means of a protection element (1510, 1511, 1512, …),

that at least one risk element (1410, 1411, 1412, …) and/or protection element (1510, 1511, 1512, …) is stored allocated to the technical facility (20), wherein a facility-specific weighting factor ($G20_1$, $G20_2$, …, $G21_1$, $G21_2$, …) is determined for each associated risk element (1410, 1411, 1412, …) and protection element (1510, 1511, 1512, …), which weighting factor ($G20_1$, $G20_2$, …, $G21_1$, $G21_2$, …) comprises the relative weighting ratio of the risk elements (1410, 1411, 1412, …) and/or protection elements (1510, 1511, 1512, …) with respect to one another,

that a facility-specific quality factor ($Q20_1$, $Q20_2$, …; $Q21_1$, $Q21_2$, …) is determined by the capture module (11) for each risk element (1410, 1411, 1412, …) and protection element (1510, 1511, 1512, …) via corresponding interfaces by means of a respective measuring and/or capture device (111, 112, 113, 114, …), wherein the quality factor ($Q20_1$, $Q20_2$, …; $Q21_1$, $Q21_2$, …) comprises the facility-specific instance of a risk element (1410, 1411, 1412, …) or protection element (1510, 1511, 1512, …) on the basis of the measured facility data (201, 202, …; 211, 212, …), and

that the evaluation module (12) determines, on the basis of the sum of the products of the risk elements (1410, 1411, 1412, …) with associated weighting factors ($G20_1$, $G20_2$, …, $G21_1$, $G21_2$, …) and quality factors ($Q20_1$, $Q20_2$, …; $Q21_1$, $Q21_2$, …) combined with the sum of the products of the protection elements (1510, 1511, 1512, …) with associated weighting factors ($G20_1$, $G20_2$, …,

$G21_1$, $G21_2$, …) and quality factors ($Q20_1$, $Q20_2$, …; $Q21_1$, $Q21_2$, …), at least one risk analysis value for automated risk management and/or facility optimization value for automated optimization of at least one protection device or minimization of a risk potential of the technical facility.

7. The method as claimed in claim 6, characterized in that at least two facility risk types (170, 171, …) are generated and stored in a memory module (17) of the optimization device (10), wherein the facility risk types (170, 171, …) comprise in each case at least one risk element (1410, 1411, 1412, …) and/or one protection element (1510, 1511, 1512, …) and each technical facility (20, 21, …) can be allocated to one facility risk type (170, 171, …) and
that a reference value is generated for each facility risk type (170, 171, …), wherein the facility data (201, 202, …; 211, 212, …) of different technical facilities (20, 21, …) are normalized by means of a normalization module (18) on the basis of the reference value of the associated facility risk type (170, 171, …).

8. The method as claimed in claim 7, characterized in that the facility risk types (170, 171, …) and/or the associated reference values are generated dynamically.

9. The method as claimed in one of claims 7 or 8, characterized in that the facility risk types (170, 171, …) are generated in such a manner that a technical facility (20, 21, …) can always be allocated unambiguously in each case to one facility risk type (170, 171, …).

10. A computer-aided method as claimed in one of claims 6 to 9, characterized in that
a two-dimensional matrix table is generated in accordance with the combination and is stored, in which

a first dimension is allocated to the protection level of a technical facility (20, 21) and a second dimension is allocated to the risk level of a technical facility (20, 21), that, for automated risk management and/or for automated optimization of the service life of the technical facility (20, 21, …), the sum of the products of the protection elements (1510, 1511, 1512, …) with associated weighting factors ($G20_1$, $G20_2$, …, $G21_1$, $G21_2$, …) and quality factors ($Q20_1$, $Q20_2$, …; $Q21_1$, $Q21_2$, …) of the technical facility (20, 21, …) is transferred in the first dimension and the sum of the products of the risk elements (1410, 1411, 1412, …) with associated weighting factors ($G20_1$, $G20_2$, …, $G21_1$, $G21_2$, …) and quality factors ($Q20_1$, $Q20_2$, …; $Q21_1$, $Q21_2$, …) of the technical facility (20, 21, …) is transferred in the second dimension, and that the at least one risk analysis value and/or facility optimization value is determined on the basis of the location of the entry in the matrix table.

11. The computer-aided method as claimed in claim 10, characterized in that the matrix table is divided into predefinable sectors, wherein a sector corresponds to at least one definable risk analysis value and/or facility optimization value.

12. The computer-aided method as claimed in one of claims 10 or 11, characterized in that the matrix table is normalized by means of a facility-risk-specific normalization factor for determining the risk analysis values and/or facility optimization values for a technical facility (20, 21).

13. The computer-aided method as claimed in claim 12, characterized in that the facility-risk-specific normalization factor is generated dynamically on the basis of available facility data of technical

facilities (20, 21) of the corresponding facility risk type (170, 171, …).

14. The computer-aided method as claimed in one of claims 10 to 12, characterized in that the scale of the first and/or second dimension of the matrix table can be linearly selected.

15. The computer-aided method as claimed in one of claims 10 to 12, characterized in that the scale of the first and/or second dimension of the matrix table can be nonlinearly selected.

16. The computer-aided method as claimed in one of claims 6 to 15, characterized in that the risk analysis values and/or facility optimization values for possible combinations and weightings of the protection elements (1510, 1511, 1512, …) and/or risk elements (1410, 1411, 1412, …) are generated automatically and stored accessible to a user by means of an extrapolation module (19).

17. The computer-aided method as claimed in one of claims 6 to 16, characterized in that a group risk factor is allocated to each facility risk type (170, 171, …) by means of evaluation module (12), wherein the group risk factor comprises the overall risk of all technical facilities of a facility risk type (170, 171, …).

18. The computer-aided method as claimed in one of claims 6 to 17, characterized in that the group risk factor is generated dynamically by means of evaluation module (12).

19. The computer-aided method as claimed in one of claims 6 to 18, characterized in that the capture module (11) is arranged accessible decentralized via a network (50).

20. The computer-aided method as claimed in one of claims 6 to 19, characterized in that groups of protection elements (1510, 1511, 1512, …) are formed as knock-out protection elements with one or more protection elements (1510, 1511, 1512, …) by means of evaluation module (12), wherein a knock-out protection element determines and/or dominates the behavior of the entire group if a given limit value of the knock-out protection element is reached.

21. A computer-aided portfolio management system, characterized in that
the portfolio management system comprises a first database (14) with predefined risk elements (1410, 1411, 1412, …), wherein a risk instance and/or a risk potential of the technical facility (20, 21, …) can be detected in a quantified manner by means of a risk element (1410, 1411, 1412, …),
that the portfolio management system comprises a second database (15) with predefined protection elements (1510, 1511, 1512, …), wherein a protection device and/or a protection possibility of technical facilities (20, 21, …) can be detected in a quantified manner by means of a protection element (1510, 1511, 1512, …),
that at least one risk element (1410, 1411, 1412, …) and/or at least one protection element (1510, 1511, 1512, …) is stored allocated to the technical facility (20, 21, …), wherein a facility-specific weighting factor ($G20_1$, $G20_2$, …, $G21_1$, $G21_2$, …) can be determined for each risk element (1410, 1411, 1412, …) and protection element (1510, 1511, 1512, …), which weighting factor ($G20_1$, $G20_2$, …, $G21_1$, $G21_2$, …) comprises the relative weighting ratio of the risk element (1410, 1411, 1412, …) and/or protection element (1510, 1511, 1512, …) with respect to one another,
that the portfolio management system comprises at least one measuring and/or capture device (111, 112, 113, 114, …) with corresponding interfaces for determining a

facility-specific quality factor ($Q20_1$, $Q20_2$, …; $Q21_1$, $Q21_2$, …) for each risk element (1410, 1411, 1412, …) and protection element (1510, 1511, 1512, …), wherein the quality factor ($Q20_1$, $Q20_2$, …; $Q21_1$, $Q21_2$, …) comprises the instantaneous facility-specific instance of a technical risk element (1410, 1411, 1412, …) or protection element (1510, 1511, 1512, …) on the basis of the measured facility data (201, 202, …; 211, 212, …),

that the portfolio management system comprises an evaluation module (12) for determining risk analysis values on the basis of the sum of the products of the risk elements (1410, 1411, 1412, …) with associated weighting factors ($G20_1$, $G20_2$, …, $G21_1$, $G21_2$, …) and quality factors ($Q20_1$, $Q20_2$, …; $Q21_1$, $Q21_2$, …) combined with the sum of the products of the protection elements (1510, 1511, 1512, …) with associated weighting factors ($G20_1$, $G20_2$, …, $G21_1$, $G21_2$, …) and quality factors ($Q20_1$, $Q20_2$, …; $Q21_1$, $Q21_2$, …), wherein the portfolio management system enables or blocks the purchase and/or sale of securities and/or bonds on the basis of the risk analysis values.

22. The computer-aided system as claimed in claim 21, characterized in that a memory module (17) of the portfolio management system comprises a multiplicity of facility risk types (170, 171, …), wherein the facility risk types (170, 171, …) in each case comprise at least one risk element (1410, 1411, 1412, …) and/or one protection factor (1510, 1511, 1512, …) and each technical facility (20, 21, …) can be allocated to one facility risk type (170, 171, …),

that the portfolio management system comprises a normalization module (18) for automatically generating a facility-risk-type-specific reference value, wherein the facility data (201, 202, …; 211, 212, …) of different technical facilities (20, 21, …) are normalized by means of the normalization module (18) on

the basis of the reference value of the associated facility risk type (170, 171, …), and

that purchase and/or sale of securities can be determined by means of the portfolio management system in such a manner that loss risks are minimized with the highest possible profit possibilities.